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ABSTRACT

This manual provides curriculum materials for implementing a career exploration class in construction occupations within a Practical Arts Education program for middle/junior high school students. Introductory materials include the program master sequence, a list of construction occupations, and an overview of the competency-based instructional system for practical arts. The instructor's guide to learning activities contains guide sheets for each task assignment sheet, which present objectives, attitudes and values to be developed, checkout activities, recommended references and audiovisuals, notes and suggestions for instruction, and references and necessary tools and equipment. Master copies of learning activities are included. Appendixes include a vocabulary listing, a list of practical arts videotapes, a list of references appropriate for career exploration, and ideas for addressing students with special needs. The 14 student task assignment sheets are also included. Each contains the following components: an introduction, the objective, learning activities, a checkout activity, vocabulary, instruction sheets, and a copy of the instructor's final checklist. Tasks are provided for four families of construction occupations: carpentry, masonry, plumbing, and electricity. (YLB)

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PRACTICAL ARTS

Construction Exploration

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1983

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[Student Task Assignment Sheets]

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PROGRAM MASTER SEQUENCE
PRACTICAL ARTS

Construction Exploration

CODE NUMBER		MODULE STOCK NUMBER	SLIDE STOCK NUMBER	TAPE STOCK NUMBER
CARPENTRY FAMILY				
PA-CO-1	Using Fastening Devices	6-201	*	*
PA-CO-2	Using Cutting Tools	6-202	*	*
PA-CO-3	Assembling and Erecting a Wall Section	6-203	*	*
PA-CO-4	Laying Out and Cutting Common Rafters	6-204	*	*
PA-CO-5	Installing Asphalt Shingles	6-205	*	*
MASONRY FAMILY				
PA-CO-6	Pouring a Concrete Stepping Stone	6-206	*	*
PA-CO-7	Mixing Mortar	6-207	*	*
PA-CO-8	Laying a Multi-Course Wall	6-208	*	*
PLUMBING FAMILY				
PA-CO-9	Joining Plastic Fittings	6-209	*	*
ELECTRICITY FAMILY				
PA-CO-10	Wiring a Switched Light Circuit	6-210	*	*
PA-CO-11	Identifying a Defective Fuse	6-211	*	*
PA-CO-12	Replacing a Fuse	6-212	*	*
PA-CO-13	Replacing a Light Switch	6-213	*	*
PA-CO-14	Replacing a Receptacle	6-214	*	*

CONSTRUCTION OCCUPATIONS

Carpentry Job Family (Rough Carpenters and Finish Carpenters)

Carpenter foreman	House carpenter	Cabinetmaker
Form carpenter	Framing carpenter	Carpet layer
Timbering foreman	Roofer	Floor layer
Maintenance carpenter	Carpenter's helper	Painter

Masonry Job Family

Brick mason	Cement mason
Stone mason	Plasterer
Block mason	Hod carrier
Tile and marble setter	Tuck pointer

Plumbing Job Family

Plumber
Boilermaker
Pipefitter

Electricity Job Family

Electrician	Power house electrician
Line person and cable splicer	Substation electrician
Meter reader	Equipment installer
Cable puller	Ground person
Calibrator	Air-conditioning installer
Conduit person	

OVERVIEW OF THE CBVE INSTRUCTIONAL SYSTEM FOR PRACTICAL ARTS

Overview of Program

The purpose of the Practical Arts Education program is to broaden the experiences of middle/junior high school students by providing them with an opportunity to become oriented to the world of work and explore a diversity of career goals in order that they may be better prepared to make decisions on their personal needs and future goals. The Practical Arts program consists of a series of career exploration classes based on the occupational clusters spread over a two-year period. A cruise through each occupational cluster shall include the implementation of three behavioral components or domains.

- (A) Cognitive: Students shall survey or cruise the content of the occupational cluster. This survey should include the scope, levels, working conditions, entry requirements, duties performed, opportunities, and related jobs in the occupational cluster.
- (B) Psychomotor: Students shall have in each cluster experiences of tasks that will be the same as or similar to those who work in the occupational cluster. These experiences or tasks shall be action oriented, vary with the students' interests, aptitudes, and abilities, and be at various levels of employment within a cluster.
- (C) Affective: Students shall receive guidance and the opportunity to systematically apply those knowledges and experiences within the cluster to his/her own interest and abilities, his/her present and future choices, and future occupational decisions and experiences.

The competency-based vocational education curriculum is specifically directed at the psychomotor, activities, experience, or tasks aspect of the Practical Arts program. Teachers are encouraged to augment their lesson plans with cognitive information about the occupational clusters from other sources. The curriculum here will help specifically in the psychomotor aspect of the program.

Competency-Based Vocational Education

The purpose of this manual is to aid the instructor in implementing a competency-based instructional program. It is intended as a guide and resource for the teacher using CBVE materials. The materials in any occupational area have several common elements, particularly their purpose and their format, which will be discussed later.

Regardless of the delivery system used to implement it, CBVE is based on the concept of competencies. That is to say, it is an instructional system in which: (1) the competencies for specific occupations are built around tasks validated by incumbent workers; (2) instruction is designed around performance objectives based on the worker tasks; (3) students are held accountable for meeting the specified minimum standards of performance required for entry-level jobs.

These instructional materials have been developed by Kentucky teachers. They have attempted to provide relevant learning activities and performance objectives which include: (1) the skills (or tasks) which the student must learn; (2) the conditions under which the student must perform; and (3) the standard or level of achievement to which the student must perform.

The purpose of the Curriculum Unit (CBVE) is to develop and assist the implementation of competency-based instructional materials. The Unit is located at:

1910 Capital Plaza Tower
Frankfort, KY 40601

To facilitate the implementation of CBVE materials, a person has been identified in each vocational region as a CBVE Contact Person. Please address any problems or concerns about your CBVE program to your Regional Contact Person.

By the time you receive your CBVE materials, you should have attended a workshop for teachers implementing CBVE materials. The Inservice Education modules, which were distributed at the workshop, are your greatest source of suggestions for setting up and managing a CBVE program. For more detailed information, consult your inservice modules or your Regional Contact Person.

Using the Instructor's Manual

This Instructor's Manual is divided into two sections: introductory materials and Instructor's Guide to Learning Activities. The introductory materials include, among other things, the Program Master Sequence. It contains a listing of the task assignment sheet and slide/tape titles, code numbers, and stock numbers.

You can use the Program Master Sequence as a quick reference guide to the contents of the instructional program, as well as a checklist for insuring that all materials have been received. The code numbers and stock numbers serve as a guide to ordering additional materials.

The Instructor's Guide to Learning Activities is the heart of this manual, because it contains a brief listing of the contents of each task assignment sheet with suggestions for its use. It is suggested that you insert the corresponding task assignment sheet behind the Guide Sheets so you will have the complete program in one place.

Format is consistent throughout all CBVE programs in that the materials contain the same basic components:

Introduction - tells the student what he/she will learn and why it is important.

Objective - clearly states what the student is expected to know or do, under what conditions, and how well.

Learning Activities - a "road map" for the student to follow in going through the task assignment sheets; list the various activities the student will perform in learning the task.

Instructor's Final Checklist - tells the student and the instructor exactly what the student will be evaluated on in the check-out activity; the instructor uses this sheet to rate the student's performance.

Check-Out Activities - tells the student what he/she will be asked to do for the final test or performance.

The Instructor's Guide Sheets in this manual present the essential information in capsule form. In addition, they list: the recommended references and audio-visuals; attitudes and values to be developed; notes and suggestions for instruction; alternate activities for students; necessary tools and equipment; and space for teacher's notes.

The task assignment sheets are designed to be left intact. Students should be reminded not to write on any of the pages. In some cases, they will be required to obtain duplicates or sheets like the ones shown. These are often student self-checks. They can be filed in a folder and can be obtained as needed.

The Instructor's Final Checklist is another page that should not be written on. It should remain in the task assignment sheet although you may want to make additional copies of it to place in students' folders.

INSTRUCTOR'S GUIDE TO LEARNING ACTIVITIES

USING FASTENING DEVICES

OBJECTIVE

GIVEN a claw hammer, two 2" X 4" X 2' boards, two 16d common nails, and a framing square,

NAIL THE BOARDS TOGETHER.

YOU SHOULD place the boards so that they are at right angles and square to each other. The nails should be driven their entire length into the wood without bending the nails, splitting the wood, or damaging the boards.

ATTITUDES AND VALUES TO BE DEVELOPED

--Students will learn to recognize and to appreciate the qualities of a well constructed wood frame product.

CONTENTS

Learning
Activity Number

Instructor's Final Checklist

USING FASTENING DEVICES

5

CHECK-OUT ACTIVITY

Your teacher will provide the necessary supplies. Nail two 2" X 4" X 2' boards together so that they are at right angles and square with each other.

SUGGESTED REFERENCES

Landers, Construction/Materials, Methods, Careers, The Goodheart-Wilcox Co., 1976.

Groneman and Feirer, General Industrial Education, McGraw-Hill Book Co., 1979.

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
1	Have the students read about various types of nails. Discuss the information as a class.	<u>Construction/Materials, Methods, Careers</u> , pp. 188-195. <u>General Industrial Education</u> , pp. 245-247. (Note: The above are suggested references. If you do not have these books, you may use other appropriate references.)	
2	Prepare a display of nails. Explain how each type is used.	Various types and sizes of nails	
3	Demonstrate how to join the boards so that they are at right angles and square. Explain how to use a framing square.	Two 2" X 4" boards Two 16d common nails Claw hammer Framing square	
4	Have students practice driving and pulling the nails. When they can do this properly, have them practice nailing the boards. Check their work.	Same supplies as in Learning Activity 2 for each student	
5	Have each student nail the boards together. Use the Instructor's Final Checklist to evaluate each student's work.	For each student: Two 2" X 4" X 2' boards Two 16d common nails Claw hammer Framing square Instructor's Final Checklist	

USING CUTTING TOOLS

OBJECTIVE

GIVEN a crosscut hand saw, rip hand saw, framing square, pencil, and a 2" X 4" X 2' pine board,

LAYOUT AND CUT THE BOARD.

YOU SHOULD select the proper cutting tools and cut the board squarely and to the desired length.

ATTITUDES AND VALUES TO BE DEVELOPED

--Students will realize that a good craftsman uses the proper tools to do his/her work.

CONTENTSInstructor's Final ChecklistLearning
Activity Number

USING CUTTING TOOLS

5

CHECK-OUT ACTIVITY

You will be provided a 2" X 4" X 2' pine board and cutting tools. Select the proper tools, and layout and cut the board to the proper length. Your teacher will tell you the length to which it should be cut.

SUGGESTED REFERENCE

Groneman & Feirer, General Industrial Education, McGraw-Hill Book Company, Sixth Edition, 1979.

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
1	Prepare a display of basic cutting tools, and let the students examine them. Give the names and uses of the tools.	Basic cutting tools	
2	Have students read about selecting and using the proper hand saws. Discuss the information. (You may decide to invite a resource person from industry to visit the class and discuss techniques used in industry.)	<u>General Industrial Education</u> , pp. 216-219	
3	Demonstrate how to layout and cut a 2" X 4" board. <u>Be sure to stress cutting on the waste side of the pencil mark.</u>	Crosscut hand saw Rip hand saw Framing square Pencil 2" X 4" board	
4	Let students practice laying out and cutting a 2" X 4" board to a specified length.	See Learning Activity 3	
5	Have students cut the board. Specify the length to which you want it cut. Use the Instructor's Final Checklist to evaluate each student's performance.	Crosscut hand saw Rip hand saw Framing square Pencil 2" X 4" X 2' pine board Instructor's Final Checklist	

ASSEMBLING AND ERECTING A WALL SECTION

OBJECTIVE

GIVEN pieces of lumber of 2" X 4" dimension, ruler, square, claw hammer, nails (16d), and hand saw,

CUT AND ASSEMBLE THE PIECES, AND ERECT A MODEL WALL SECTION.

YOUR WORK will be rated in accordance with the Instructor's Final Checklist.

ATTITUDES AND VALUES TO BE DEVELOPED

--Students will understand the value of a well constructed wall section to the overall construction of a house.

CONTENTSInstructor's Final ChecklistLearning
Activity Number

ASSEMBLING AND ERECTING A WALL SECTION

4

CHECK-OUT ACTIVITY

You will be provided the necessary tools and materials. Assemble and erect a model wall section.

SUGGESTED REFERENCES

Landers, Construction-Materials, Methods, and Careers, The Goodheart-Wilcox Co., Inc., 1976.

Lux, Ray, Blankenbaker, Umstattd, World of Construction, McKnight Publishing Co., Fifth Edition, 1982.

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
1	Have students read about basic house construction. Discuss the information.	<u>Construction-Materials, and Careers</u> , pp. 295-301 <u>World of Construction</u> , p. 205	
2	Show the class a model wall section. Explain each part. (Students should be thoroughly familiar with the different parts.)	Model wall section	
3	Arrange for the class to visit a construction site to observe a wall section being assembled and erected. (If this is not possible, you may show a film.)	Construction site	
4	Have small groups of students assemble and erect a model wall section. (NOTE: After the wall section has been assembled, prior to fastening it to the floor, measure diagonally from corner to corner to check for squareness.) Use the Instructor's Final Checklist to evaluate each student's work.	For each group: 2" X 4" lumber Hand saw Ruler Square Claw hammer Nails (16 d) Instructor's Final Checklist	

LAYING OUT AND CUTTING A COMMON RAFTER

OBJECTIVE

GIVEN a 2" X 4" board, a framing square, a hand saw, and the necessary information,

LAYOUT AND CUT A COMMON RAFTER.

YOUR RAFTER should fit the template supplied by your teacher.

ATTITUDES AND VALUES TO BE DEVELOPED

--Students will realize that in order for a roof of a building to be constructed well, the rafters must fit accurately.

CONTENTS

Learning
Activity NumberInstructor's Final Checklist

LAYING OUT AND CUTTING A COMMON RAFTER

4

CHECK-OUT ACTIVITY

Your teacher will provide the necessary supplies and information. Layout and cut a common rafter to fit the template supplied by your teacher.

SUGGESTED REFERENCES

Landers, Construction/Materials, Methods, Careers, The Goodheart-Wilcox Co., Inc., 1976.

Lux, Ray, Blankenbaker, Umstadtdt, World of Construction, McKnight Publishing Co., Fifth Edition, 1982.

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
1	Have the students read about roof construction. Discuss the information as a class.	<u>Construction/Materials, Methods, Careers</u> , pp. 310-319 <u>World of Construction</u> , pp. 244-247.	
2	Demonstrate how to lay-out and cut a common rafter. (Save this to be used as a template.) You may want to invite a resource person from the construction industry to demonstrate procedures and techniques used on the job.	2" X 4" board Framing square Hand saw	
3	Have students practice using a framing square to layout different pitches and spans of roofs. Also have them practice cutting a rafter.	For each student: Same materials as listed in Learning Activity 2	
4	Have each student cut a rafter to fit the template. Use the Instructor's Final Checklist to evaluate each rafter.	Template For each student: 2" X 4" board Framing square Hand saw Instructor's Final Checklist	

INSTALLING ASPHALT SHINGLES

OBJECTIVE

GIVEN a bundle of asphalt shingles, felt paper roofing, hammer, roofing nails, roofer's knife, straightedge, and chalkline,

INSTALL THE SHINGLES ON A ROOF MODEL.

THE ROOFING PAPER should be applied properly. THE SHINGLES should be cut accurately and evenly, aligned properly, fastened securely, and the ends trimmed neatly.

ATTITUDES AND VALUES TO BE DEVELOPED

--Students will realize that shingles must be aligned properly in order to provide a protective, water-resistant covering and to make an attractive roof.

CONTENTSInstruction SheetLearning
Activity Number

I HOW TO INSTALL ASPHALT SHINGLES

1

Instructor's Final Checklist

INSTALLING ASPHALT SHINGLES

5

CHECK-OUT ACTIVITY

You will be provided the necessary tools and supplies. Install asphalt shingles on the roof model provided by your teacher.

SUGGESTED REFERENCES (for the teacher)

Reed, Residential Carpentry, John Wiley & Sons, 1980.

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
	Before starting this task, you should build a model roof structure for student to use when installing asphalt shingles.		
1	Have the class read Instruction Sheet I. You may want students to take turns reading each step orally and then discussing the information. You may arrange for the class to visit a construction site where shingles are being installed.	Instruction Sheet I	
2	Show students how to apply roofing paper, and have them practice the procedures.	15 lb. asphalt saturated felt roofing paper Hammer Roofing nails Roof model	
3	Show students how to cut shingles, and have them practice cutting one.	Asphalt shingles Roofer's knife	
4	Show the class how to install asphalt shingles: --starter strip --first and second course --ridge Have students practice installing several shingles, preferably the first two shingles	Roof model covered with roofing paper Asphalt shingles Hammer Roofing nails Roofer's knife Straightedge Chalkline	

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
	for the starter strip, the first two for the first course, and the first two for the second course. (Note: The roofing paper and whole shingles may be removed and used again.)		
5	Have students install asphalt shingles to the roof model. They may work in small groups. Use the Instructor's Final Checklist to evaluate each student's work.	See tools and supplies listed in Learning Activity 4 Instructor's Final Check- list	

POUR A CONCRETE STEPPING STONE

OBJECTIVE

GIVEN a wheelbarrow, mixing hoe, bag of concrete mix, water, and a form,

POUR A CONCRETE STEPPING STONE.

YOUR STEPPING STONE should set and dry within the proper length of time, release from the form intact with no honeycomb appearance.

ATTITUDES AND VALUES TO BE DEVELOPED

--Students will realize that concrete must be mixed and poured properly in order to provide strong, sound foundations.

CONTENTSInstructor's Final ChecklistLearning
Activity Number

POUR A CONCRETE STEPPING STONE

5

CHECK-OUT ACTIVITY

Your teacher will provide the necessary materials. Mix a batch of concrete and pour a concrete stepping stone.

SUGGESTED REFERENCES

Groneman, Feirer, General Industrial Education, McGraw-Hill Book Co., Sixth Edition, 1979.

Landers, Construction/Materials, Methods, Careers, The Goodheart-Wilcox Co., Inc., 1976.

Lux, Ray, Blankenbaker, Umstattd, World of Construction, McKnight Publishing Co., Fifth Edition, 1982.

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
1	Have students read about mixing and pouring concrete. Discuss the information as a class.	<u>General Industrial Education</u> , pp. 547-548 <u>Construction/Materials, Methods, Careers</u> , pp. 129-136 <u>World of Construction</u> , pp. 178-184	
2	Arrange for students to visit a construction site to observe concrete being mixed and poured, OR Invite a construction worker to class, and have the students interview him/her about the job. Have him/her explain how concrete is mixed and poured on the job.		
3	Demonstrate how to mix concrete, and pour into a form. <u>(NOTE: ADD A LITTLE WATER AT A TIME. Do not add too much to the mixture.)</u> Explain each step and the proportions of each ingredient. Tamp into the form to eliminate any voids.	Wheelbarrow Mixing hoe Bag of concrete mix Water Form (metal or wood) Oil (to coat form)	

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
4	Divide the class into small groups. Have the students work together to practice mixing a small batch of concrete. (NOTE: Observe students when adding water to assure the correct proportion. Emphasize adding a small amount at a time.)	For each small group: Supplies listed in Learning Activity 3	
5	Students may work in small groups or individually to mix a batch of concrete and pour a concrete stepping stone. Use the Instructor's Final Checklist to evaluate each batch.	Supplies listed in Learning Activity 2 Instructor's Final Checklist	

MIXING MORTAR

OBJECTIVE

GIVEN masonry cement, sand, water, shovel, wheelbarrow or mortar box, and mortar hoe,

MIX A BATCH OF MORTAR.

THE MORTAR should contain the proper proportions of materials and be of the proper consistency.

ATTITUDES AND VALUES TO BE DEVELOPED

--Students will be aware of the relationship of the proper consistency of mortar to its bonding quality.

CONTENTSInstructor's Final Checklist

Learning
Activity Number

MIXING MORTAR

4

CHECK-OUT ACTIVITY

You will be provided the necessary tools and materials. Mix a batch of mortar.

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
1	Show students the proportions of the materials used to mix mortar: --1 part masonry cement. --3 parts sand. --Sufficient amount of water that, when added to the mixture, makes a mud-like consistency.	Masonry cement Sand Water	
2	Demonstrate how to mix mortar. (Note: Add water in very small amounts in order to reach the correct consistency. The mixture must not be too thin.)	Masonry cement Sand Water Shovel Wheelbarrow or mortar box Mortar hoe	
3	Let two students work together as they practice mixing mortar. (NOTE: Always have at least one student steady the wheelbarrow while the other one mixes the mortar with a mortar hoe.)	See tools and materials listed above	
4	Have two students work together to mix a batch of mortar. Use the Instructor's Final Checklist to evaluate each batch of mortar. You may want to test the consistency by applying the mortar to cement blocks.	See tools and materials listed in Learning Activity 2 Instructor's Final Checklist Cement blocks (optional)	

LAYING A MULTI-COURSE WALL

OBJECTIVE

GIVEN mortar, 8" concrete blocks, mason's trowel, mason's hammer, level, jointing or rodding tool, and a string line,

LAY A MULTI-COURSE WALL.

YOU WILL be rated in accordance with the Instructor's Final Checklist.

ATTITUDES AND VALUES TO BE DEVELOPED

--Students will realize the importance of insuring that all blocks are aligned properly.

CONTENTS OF MODULEInstruction SheetsLearning
Activity Number

I. HOW TO LAY A MULTI-COURSE WALL

1

Instructor's Final Checklist

LAYING A MULTI-COURSE WALL

7

CHECK-OUT ACTIVITY

You will be provided the necessary tools and supplies. Lay two courses of concrete block.

SUGGESTED REFERENCES

Terry, "Here's How (Basic Blocklaying)," distributed by the Kenalex Corp., 2960 So. Fox St., Englewood, CO 80110.

Terry, "Here's How (Basic Bricklaying)," distributed by the Daystar Audio Visual, Inc., 3 Iverness Drive East, Englewood, CO 80112.

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
	<u>NOTE:</u> This task requires a footing. A concrete floor is appropriate.		
1	Have the students read about laying concrete blocks. You may refer them to Instruction Sheet I or to another reference. Discuss each step in laying a wall.	Instruction Sheet I and/or "Here's How (Basic Blocklaying)"	
2	Prepare a display of the tools and let students examine them. Demonstrate how they are used in laying blocks. Have students practice reading a level.	Mason's trowel Mason's hammer Level Jointing or rodding tool Nylon string line	
3	Let students practice spreading mortar. (NOTE: Practice mortar allows blocks to be torn down and used again. It lacks the cementing quality.)	Practice mortar (a combination of finely ground clay and sand. It is mixed with regular sand in the same proportions as for cement.) Mason's trowel	
4	Show students how to do a dry layout of blocks on the footing. Let students practice the procedure.	Footing 8" concrete blocks Chalk	
5	Show students how to lay a corner block. Let them practice this. They may work in small groups.	8" concrete corner block Mason's trowel Mason's hammer Level Practice Mortar	

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
6	(NOTE: Before you demonstrate how to lay the intermediate block, the second corner block must be laid and the string line run between the two corners.) Show the class how to lay the intermediate blocks and let the students practice doing this in small groups.	8" concrete block String line Mason's trowel Mason's hammer Level Jointing or rodding tool Practice Mortar	
7	Let students work in small groups in laying a two-course wall. Use the Instructor's Final Checklist to evaluate students as they lay the wall.	Footing 8" concrete block Mortar Mason's trowel Mason's hammer Level Jointing or rodding tool String line Instructor's Final Checklist	

JOINING PLASTIC FITTINGS

OBJECTIVE

GIVEN 1/2" ABS black plastic pipe, plastic pipe cement, coupling or T-joint, and fine sandpaper,

JOIN THE PIPE AND FITTING.

THE PIPE should fit straight into the fitting and should not come out of the fitting when pulled.

ATTITUDES AND VALUES TO BE DEVELOPED

--Students will realize the importance of clean pipe and fittings in order to have a strong bond.

CONTENTS OF MODULEInstruction SheetsLearning
Activity Number

I. HOW TO JOIN PLASTIC FITTINGS

1

Instructor's Final Checklist

JOINING PLASTIC FITTINGS

4

CHECK-OUT ACTIVITY

You will be provided the necessary supplies. Join plastic pipe to a fitting.

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
1	Have students read the Instruction Sheet. Discuss where plastic pipe is used, the different types of plastic pipe, and the procedure for joining plastic pipe to a fitting.	Instruction Sheet I	
2	(NOTE: Most plumbing suppliers have damaged pieces they can't use. They will often give them to schools or will sell them at a lower cost. If you plan to buy the pipe, the black 1/2" is cheaper by 100 ft.) Demonstrate for the class how to join plastic pipe into a fitting.	Plastic pipe (ABS, black 1/2" is the least expensive. PVS is more expensive.) Fitting (Two students can use a coupler; 3 can use a T-joint. The coupler is less expensive.) Cement solvent (comes in 4-oz. size to quart size)	
3	Have students practice joining the pipe into a fitting. They may work in small groups.	See supplies listed above	
4	Have students join plastic pipe into a fitting. Use the Instructor's Final Checklist to evaluate each student's work.	See supplies listed under Learning Activity 2 Instructor's Final Checklist	

WIRING A SWITCHED LIGHT CIRCUIT

OBJECTIVE

GIVEN a size D flashlight battery, flashlight bulb, switch, 2-foot lamp cord, and electrical tape,

WIRE THE SWITCHED LIGHT CIRCUIT.

THE LIGHT should burn when the switch is closed and go out when the switch is opened.

CONTENTS

Instruction SheetLearning
Activity Number

I HOW TO WIRE A SWITCHED LIGHT CIRCUIT

1

Instructor's Final Checklist

WIRING A SWITCHED LIGHT CIRCUIT

6

CHECK-OUT ACTIVITY

You will be provided the necessary supplies. Wire a switched light circuit.

SUGGESTED REFERENCES

Miller & Francis, Basic Industrial Arts (Electricity), McKnight Publishing Co.

Betts, Fannin, Haunstein, Exploring the Construction Industry, McKnight Publishing Co.

Landers, Construction, Goodheart-Wilcox Co., Inc.

Miller, Basic Electricity, Charles A. Bennett Co., Inc.

Weiss, Home Maintenance, Charles A. Bennett Co., Inc.

Groneman & Peirer, General Industrial Education, McGraw-Hill Book Co.

Groneman, Exploring Industry, Stech-Vaughn Co.

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
1	Have the class read Instruction Sheet I. Discuss each step presented.	Instruction Sheet I	
2	Have the class read in a reference about: (1) wiring switched light circuits; (2) safety rules.	<u>Basic Industrial Arts (Electricity)</u> , pp. 22-24 <u>Exploring the Construction, Industry</u> , pp. 301-371 <u>Construction</u> , pp. 229-237 <u>Basic Electricity</u> , pp. 57-62 <u>Home Maintenance</u> , pp. 232-236 <u>General Industrial Education</u> , pp. 437-475 <u>Exploring Industry</u> , pp. 148-178	
3	Show the class the items they will be working with. Explain the + pole and - pole. Have students identify the + and - poles.	Size D flashlight battery Flashlight bulb Switch 2-foot lamp cord Electrical tape	
4	Demonstrate how to wire a switched light circuit.	See supplies listed above	
5	Let students work in small groups to practice wiring the circuit.	See supplies listed under Learning Activity 3	
6	Have each student wire a switched light circuit.	See supplies listed under Learning Activity 3	

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
	Use the Instructor's Final Checklist to evaluate each student's work.	Instructor's Final Check- list	

IDENTIFYING DEFECTIVE FUSES

OBJECTIVE

GIVEN a fuse panel with one or more blown fuses,

IDENTIFY THE BLOWN FUSE OR FUSES.

YOU SHOULD identify each blown fuse.

ATTITUDES AND VALUES TO BE DEVELOPED

--Students will understand the importance of fuses in controlling the flow of electricity.

CONTENTS OF MODULE

Instructor's Final Checklist

Learning
Activity Number

IDENTIFYING DEFECTIVE FUSES

5

CHECK-OUT ACTIVITY

Go to the fuse panel. Make a rough sketch of the panel. Mark an "X" across the blown fuse or fuses.

SUGGESTED REFERENCES

Groneman and Feirer, General Industrial Education, McGraw-Hill Book Co., Sixth Edition, 1979.

AAVIM, Maintaining the Lighting and Wiring system, available through the State Department of Education, Office of Research and Planning, Division of Curriculum and Materials, Capital Plaza tower, Frankfort, KY 40601

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
1	Have students read about fuses. Discuss how a fuse works.	<u>General Industrial Education</u> , p. 470 <u>Maintaining the Lighting and Wiring System</u> , pp. 25-34	
2	Make a display of different types and sizes of fuses. Let the students examine them for type and amperage.	Various types of fuses: Common plug fuse Adapter-type fuse Cartridge-type fuse	
3	Have students determine whether their home wiring systems have circuit breakers or fuses and report in class.		
4	Display new and blown fuses. Let students identify the blown fuses; or Have students identify a blown fuse on a fuse panel.	New and blown fuses or Fuse panel with blown fuse	
5	Prepare a fuse panel with one or more blown fuses. Have students examine the panel to identify the blown fuses. Have them make a rough sketch of the fuse panel and place an "X" across the blown fuse or fuses. Use the Instructor's Final Checklist to evaluate each student's work.	Fuse panel with one or more blown fuses Instructor's Final Checklist	

REPLACING A FUSE

OBJECTIVE

GIVEN a fuse panel with a blown fuse and a supply of fuses,

REPLACE THE BLOWN FUSE.

YOU WILL be rated in accordance with the Instructor's Final Checklist.

ATTITUDES AND VALUES TO BE DEVELOPED

--Students will realize the dangers involved in tampering with fuses in attempting to save electricity.

CONTENTSInstructor's Final ChecklistLearning
Activity Number

REPLACING A FUSE

5

CHECK-OUT ACTIVITY

Go to the fuse panel and replace the blown fuse with a new one. Your teacher will watch as you work.

SUGGESTED REFERENCES

Groneman and Feirer, General Industrial Education, McGraw-Hill Book Co., Sixth Edition, 1979.

AAVIM, Maintaining the Lighting and Wiring System, available through the State Department of Education, Office of Research and Planning, Division of Curriculum and Materials, Capital Plaza Tower, Frankfort, KY 40601.

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
1	Have students read about fuses. Discuss: -- <u>Safety Precautions</u> to observe when changing fuses. -- The dangers of tampering with fuses: (a) placing a penny in the fuse socket; (b) tearing back a portion of the metal screw shell.	<u>General Industrial Education</u>, p. 470 <u>Maintaining the Lighting and Wiring System</u>, pp. 25-34	
2	Have students write a brief report on "Using Safety Precautions When Replacing Fuses."		
3	Demonstrate how to replace a fuse. <u>Stress safety precautions.</u>	Fuse panel with blown fuse Supply of new fuses (preferably different sizes in order to demonstrate choosing the correct size)	
4	Let students work in small groups to practice replacing a fuse. (NOTE: Observe students at all times.)	Fuse panel with blown fuse	
5	Have students replace the blown fuse. (NOTE: Observe students at all times to insure that safety procedures are being followed.) Use the Instructor's Final Checklist to evaluate each student's performance.	Fuse panel with blown fuse Supply of new fuses Instructor's Final Checklist	

REPLACING A LIGHT SWITCH

OBJECTIVE

GIVEN a single-pole light switch, a screwdriver, and a pre-wired circuit with a defective light switch,

REPLACE THE LIGHT SWITCH.

YOU WILL BE RATED in accordance with the Instructor's Final Checklist.

ATTITUDES AND VALUES TO BE DEVELOPED

--Students will realize that electricity is an extremely dangerous element and that strict observance of the safety rules is imperative.

CONTENTSInstructor's Final ChecklistLearning
Activity Number

REPLACING A LIGHT SWITCH

6

CHECK-OUT ACTIVITY

Your teacher will provide the necessary materials. Replace a light switch in a pre-wired circuit.

SUGGESTED REFERENCES

AVIM, Maintaining the Lighting and Wiring System, available from the Department of Education, Office of Research and Planning, 19th Floor, Capital Plaza Tower, Frankfort, KY 40601. \$2.75.

Groneman and Feirer, General Industrial Education, McGraw-Hill Book Co., Sixth Edition, 1979.

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
1	Explain the safety rules to observe when working with electricity. <u>This is extremely important.</u> You may prefer to have the class read about safety rules in the textbook. Giving the class a test on safety would be a good idea.		
2	Have the students read about electricity. Discuss the information as a class.	<u>General Industrial Education</u>, pp. 467-470 <u>Maintaining the Lighting and Wiring System</u>, "Replacing Single-Pole Switches," pp. 34-37	
3	Demonstrate how to disconnect the electricity to the circuit, remove the defective switch, and install a new switch. <u>Stress safety throughout the entire demonstration.</u>	Pre-wired circuit: Series circuit which has fuse box, switch mounted in switch-box, and lamp Single-pole light switch Screwdriver with <u>long blade and insulated handle</u> Pre-wired circuit with a defective light switch	
4	Have students practice disconnecting the electricity to the circuit and removing a defective switch. (NOTE: Observe students at all times.)	Pre-wired circuit with a defective light switch Screwdriver with long blade and insulated handle	
5	Have students practice using a screwdriver to fasten wires safely and securely to the switch.	Screwdriver with long blade and insulated handle Light switch	

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
6	Have each student replace the light switch. (<u>NOTE:</u> Observe student at all times.) Use the Instructor's Final Checklist to evaluate the student's performance.	Available to each student: Single pole-light switch Screwdriver with long blade and insulated handle Pre-wired circuit with a defective light switch Instructor's Final Checklist	

REPLACING A RECEPTACLE

OBJECTIVES

GIVEN an installed convenience-outlet receptacle, a new convenience-outlet receptacle, a screwdriver with a long blade and insulated handle, pocket knife, and thin-nose pliers,

REPLACE THE RECEPTACLE.

YOUR PERFORMANCE will be rated in accordance with the Instructor's Final Checklist.

ATTITUDES AND VALUES TO BE DEVELOPED

--Students will realize that receptacles differ in quality and that the better quality ones provide better electrical connections and are more durable.

CONTENTSInstructor's Final ChecklistLearning
Activity Number

REPLACING A RECEPTACLE

5

CHECK-OUT ACTIVITY

Go to the receptacle. Turn off the power to the circuit, remove the old receptacle, and install a new receptacle. Your teacher will watch you as you work.

SUGGESTED REFERENCES

Groneman and Feirer, General Industrial Education, McGraw-Hill Book Co., Sixth Edition, 1979.

AAVIM, Maintaining the Lighting and Wiring System, available through the State Department of Education, Office of Research and Planning, Division of Curriculum and Materials, Capital Plaza Tower, Frankfort, KY 40601

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
1	Have students read about receptacles. Discuss the information, <u>Stress</u> safety procedures when dealing with electricity.	<u>General Industrial Education</u> , p. 470 <u>Maintaining the Lighting and Wiring System</u> , pp. 47-51	
2	Have students list the kinds of electrical receptacles installed in their homes: convenience-outlet, dryer, range.		
3	Demonstrate for the class how to turn off the power, remove an old receptacle, and install a new one. (NOTE: All power to the circuit should be turned off prior to any work on the circuit.) Stress safety procedures relating to each step in replacing the receptacle.	Wall section or model wall section including a convenience receptacle Electrician's screwdriver Pocket knife Thin-nose pliers New convenience receptacle	
4	Let students practice using a screwdriver to disconnect and fasten wires to the receptacle. Stress safety procedures.	Electrician's screwdriver Receptacle Wires to the receptacle	
5	Have each student replace a receptacle. (NOTE: Watch the entire procedure to insure that safety procedures are being followed.) An alternative to using a new receptacle is for students to remove the old one and reinstall it.	Wall section or model wall section including a convenience receptacle Electrician's screwdriver Pocket knife Thin-nose pliers New convenience receptacle Instructor's Final Checklist	

LA#	NOTES AND SUGGESTIONS FOR INSTRUCTION	REFERENCES AND SPECIAL TOOLS AND EQUIPMENT	TEACHER'S NOTES
5	Use the Instructor's Final Checklist to evaluate each student's performance.		

APPENDIX

VOCABULARY LISTING

Ampere - a unit for measuring the strength of an electric current.

Assemble - to put together.

Bird's mouth - the notch in the rafter that fits the top plates of the wall studs.

Cap plate - the uppermost plate in a frame wall that has two plates at the top; may also be called a "Doubler" or "Rafter Plate."

Circuit breaker - a protective device for an electrical wiring system; it heats when the electrical load gets too heavy, which releases a switch to cut off the current.

Claw hammer - a hammer with one end of the head forked and curved like a claw, used for pulling nails.

Common rafter - one of several identical roof structural members that runs at a right angle to the wall and ends at a right angle to the ridgeboard.

Convenience-outlet receptacle - The common type of electric wall outlet. There are three kinds: "single" which will take only one plug at a time; "duplex" which will take two plugs at a time; and "triplex" which will take three plugs at a time.

Coupling - a device or part for joining two pipes together.

Course - the exposed row or layer of an exterior finishing material such as shingles, bricks, or siding.

Dryer or range receptacles - an outlet that is shaped so that it will take the plug on a dryer or a range. Electric dryers use a 30 ampere receptacle. Electric ranges use a 50 ampere receptacle.

Eaves - a part of the roof that extends beyond its supporting walls.

Erect - to build.

Flush - at the same level or in the same plane.

Framing square - an instrument having two sides that can be used to test the squareness of anything.

Fuse - a protective device for an electrical wiring system; a metal strip or link melts in two when the electrical load gets too heavy, and no further electrical current can flow through.

Joist - a horizontal structural member that, together with other similar members, supports a floor or ceiling system.

(Vocabulary Listing, (page 2)

Pitch - the slope of a roof.

+ pole - the end of the battery with the center contact.

- pole - the flat end of the battery.

Ridge - the uppermost line of a roof where two opposite slopes meet.

Ridgeboard - the horizontal board where the rafters meet at the very top of the roof; it runs the length of the roof.

Roof sheathing - the material, usually in sheet form, applied across the exterior studs and rafters for strength and protection.

Shingles - thin pieces of material applied in overlapping courses as a weatherproof covering on walls and roofs.

Sole plate - (bottom plate) the lowest plate in a wall in a platform framing system, resting on the sub floor.

Sub floor - the rough floor laid across floor joists and under finish flooring.

T-joint - pipe fitting similar to the letter "T", used to join three pipes.

Template - a full size pattern.

Top Plate - the framing member nailed across the upper ends of studs and beneath any cap plate.

PRACTICAL ARTS VIDEOTAPES

These videotapes are available through the Kentucky Department of Education, Office of Research and Planning, Division of Materials and Curriculum, 19th Floor, Capital Plaza Tower, Frankfort, Kentucky 40601; Telephone: (502) 564-2000.

Agribusiness, Natural Resources and Environmental Occupations

"Coal: Kentucky's Ace in the Hole": 1/2-inch color cartridge; 23 minutes; some on 1/2-inch reel-to-reel; 2 copies on 3/4-inch cassette. Describes types of occupations available in the coal industry and discusses useful coal by-products.

"Wildlife": 3/4-inch color cassette; 25 minutes. Explains the role of wildlife in conservation.

"Energy Careers": 1/2-inch color cartridge; 15 minutes; some on 1/2-inch reel-to-reel; 2 copies on 3/4-inch cassette. Explores careers in the alternative energy areas of solar energy, wind, and coal liquification.

"Agribusiness": 3/4-inch color cassette; 18 minutes. Deals with careers in agriculture and other farm-related careers.

Business and Office Occupations

"The Secretary": 3/4-inch cassette; 18 minutes. Identifies various careers available in the secretarial field.

Communications and Media Occupations

"One Moment, Please": 1/2-inch color cartridge (2 cartridges available); 18 minutes. Explores occupations, ranging from camera operator to producer, available in radio and television production and necessary qualifications.

"Number, Please": 3/4-inch color cassette; 18 minutes. Discusses careers available in the telephone industry and shows on-the-job interviews for jobs in the industry.

"Roll the Presses": 3/4-inch cassette; 19 minutes, 20 seconds. Gives overview of careers needed to produce a newspaper.

Construction Occupations

"Construction Careers": 1/2-inch color cartridge; 20 minutes; some on 1/2-inch reel-to-reel; 2 copies on 3/4-inch cassette. Explores types of occupations, including carpenters, electricians, and plumbers, in construction careers and necessary skills needed for these careers.

Home Economics Occupations

"Gainful Home Economics": 3/4-inch color cassette; 20 minutes, 45 seconds. Describes occupations related to home economics in which people are gainfully employed.

Health Occupations

"RX Good Health": 1/2-inch color cartridge; 23 minutes; 2 copies on 3/4-inch color cassette. Explores health careers, such as medical secretary, laboratory technician, and physical therapist, in addition to doctor and nurse.

Hospitality and Recreation Occupations

"Hospitality Unlimited": 1/2-inch cartridge tape; 16 minutes; color; also on 1/2-inch reel-to-reel; 2 copies on 3/4-inch cassette. Identifies careers in the restaurant industry and hotel/motel management.

Manufacturing Occupations

"Down the Assembly Line": 3/4-inch cassette; 18 minutes. Depicts production line workers on the job; introduces students to the division of labor system whereby each worker becomes skilled in a single operation.

Orientation to the World of Work

"The Rest of Your Life": 2/4-inch cassette; 30 minutes. Introduces students to step-by-step procedures necessary in seeking employment.

Personal Service Occupations

"Barbering and Cosmetology": 3/4-inch cassette. Explores careers available in these two areas.

Public Service Occupations

"Dear John Mail": 1/2-inch color cartridge; 20 minutes; 2 copies on 3/4-inch color cassette. Explores the types of postal careers and available postal facilities.

"Law Enforcement": 3/4-inch color cassette; 25 minutes. Presents occupations available in law enforcement careers, ranging from policeman to radio operator, and their functions; also identifies necessary qualifications for entering the occupations.

"The Military": 3/4-inch cassette; 17 minutes, 30 seconds. Gives students an overview of various careers associated with the military.

Transportation Occupations

"Tracking A Trucker": 1/2-inch cartridge tape; 22 minutes; color; some on 1/2-inch reel-to-reel; 2 copies on 3/4-inch cassette. Explores occupations needed to support the trucking industry from mechanic to driver.

"The People of the Airlines": 3/4-inch cassette; 22 minutes. Shows people on the job at the airport and on the airplane.

REFERENCES APPROPRIATE FOR CAREER EXPLORATION

Documents

Exploring Careers, 1979

Bulletin 2001

Bureau of Labor Statistics

1371 Peachtree Street, N.E.

Atlanta, GA 30309

Telephone: (404) 881-4418

Occupational Outlook Handbook

Bulletin 1955

Superintendent of Documents

U.S. Government Printing Office

Washington, DC 20402

(Cloth Cover) Stock No. 029-001-02067-8

(Paper Cover) Stock No. 029-001-02059-7

Dictionary of Occupational Titles

Superintendent of Documents

U.S. Government Printing Office

Washington, DC 20402

Stock No. 029-013-00079-9

Sources of Information

Practical Arts Unit

Bureau of Vocational Education

21st Floor

Capital Plaza Tower

Frankfort, KY 40601

Telephone: (502) 564-3472

Gregg/McGraw-Hill

Webster Division

1221 Avenue of the Americas

New York, NY 10020

McKnight Publishing Company

Bloomington, IL 61701

New Jersey Vocational Technical

Curriculum Laboratory

Rutgers University

4103 Kilmer Campus

New Brunswick, NJ 08903

Ohio Department of Education

Division of Vocational Education

Career Development Service

Columbus, OH 43215

Superintendent of Documents

U.S. Government Printing Office

Washington, DC 20402

Xerox Educational Publications

P.O. Box 16629

Columbus, OH 43216

ADDRESSING STUDENTS WITH SPECIAL NEEDS

Some students may need special help in achieving competencies. Ideas are presented here for helping identify those students and modifying materials and techniques to help them succeed.

Identifying Students with Special Needs

Generally speaking, those students who cannot succeed in the regular vocational education programs without special help are termed "students with special needs" (Vocational Education Act of 1963 and Amendments). Persons most likely to be identified as students with special needs are the academically and economically disadvantaged and the handicapped--the mentally retarded, deaf and hard of hearing, speech impaired, emotionally disturbed, orthopedically (physically) impaired, health impaired, and learning disabled.

The handicapped are further identified as those (1) with a physical or mental disability that substantially impairs one or more major life activities--walking, seeing, hearing, speaking, working, or learning; (2) who have a record or history of such impairment or condition; and (3) who are regarded as having an impairment (Rehabilitation Act of 1973). Women, minorities, the limited English speaking, and others likely to be underemployed or striving for equal opportunity in employment when meeting the criteria for academic or economic deprivation, are specifically identified in the disadvantaged group to be given special help.

Formulating a Basic Approach to Teaching

Society recognizes the right of every individual to an appropriate education, and the law mandates giving persons with special needs an equal chance. In brief:

1. The Vocational Education Amendments of 1976 give special emphasis to developing and providing programs of vocational education for "those with special educational handicaps" and reserves moneys to do so.
2. The Education for All Handicapped Children Act of 1975 assures that all handicapped children between the ages of three to twenty-one have available to them a free, appropriate public education which relates to their unique needs and is provided in the least restrictive environment.
3. The Rehabilitation Act of 1973 prohibits discrimination on the basis of handicap in any program or activity receiving federal financial assistance and directs employers to take affirmative action in hiring handicapped people.

The Vocational Education Act of 1976 provides additional support for the handicapped.

5. The Civil Rights Act of 1964 prohibits discrimination in employment on the basis of sex, race, color, religion, or national origin in any program or activity receiving federal financial assistance--including training for employment.

We must, then, provide equal opportunity to learn in our instructional processes.

Basically, an approach to teaching which recognizes individual differences in all students provides the best atmosphere for disadvantaged and handicapped students. This approach allows students to work at different rates; involves large group, small group, and individual instruction; incorporates a variety of instructional materials, media, and teaching techniques; and involves a variety of learning activities--reading, doing, discussing, listening, viewing, experiencing, sharing, cooperating, relating, using the senses, etc. It gives disadvantaged and handicapped students the dignity of exploring, learning, and facing the same experiences and responsibilities as other students, without limiting their possibilities by stereotyped concepts of what they can or cannot do.

It involves being organized, with students completely familiar with the teaching/learning plan. When beginning a CBVE class, for example, explain what learning to attain competencies means, how the students will carry out their work, how to use the modules, where to find materials, how and when tests will be given, how "passing" or achieving competency is determined, and what your role as a teacher is.

It also means teacher direction for those students who are not self-directed learners--those with poor academic backgrounds who thrive on teacher interaction and need immediate feedback, instruction simplified, procedures modified, social development as well as specific job skills, role models, or other special aid. For these students, the learning activities described in the modules may become the teacher's lesson plan and be utilized in large-group and small-group settings before the individual student attempts doing learning activities alone. The teacher-directed class might proceed as follows: teacher introduction to tasks to be performed by module or cluster of modules, explanation of what is to be learned and why, presentation of information in small chunks, demonstrations, student tryout and practice, time for questions and answers, trial test followed by reteaching, and evaluation. The teacher will employ a variety of strategies to address the learning needs and styles of the student.

Using Special Strategies

In order to determine the most appropriate teaching strategies, assess the students for kinds of special help required, and develop a plan for meeting any unique needs. Refer to Mainstreaming Guidebook for Vocational Educators by Dahl, Appleby, and Lipe (Olympus Publishing Company, Salt Lake City, Utah 84105), for modifications and general classroom strategies for meeting the unique needs of the different handicapped populations.

Also, enlist the advice and help of employers, support personnel, and agencies and organizations serving disadvantaged and handicapped populations in your school system and geographic area.

Redirecting Teaching Strategies Usually Used

Many of the strategies usually used with regular students may be redirected or modified and also provide effective learning activities for students with special needs. An explanation of how this may be done follows.

AUDIO-VISUALS (films, filmstrips, slide/tape presentations, videotapes, and ETV and commercial television programs). The combination of sight and sound provides more effective communication than either sight or sound alone. Audio-visuals may be used to supplement or replace other methods of presenting information. The hearing impaired will require captioning, signing, or a printed script written at the appropriate reading level or presenting only essential details. The visually impaired may glean information from the sound source, but additional explanation will need to be provided for any visual display of information which is not explained adequately by the narration. Some audio-visual presentations, particularly 8 mm and 16 mm films, may move too fast for the information to be grasped and need to be evaluated with this in mind.

CONTACT WITH WORK ENVIRONMENT. Handicapping conditions, limited finances, geographic isolation, cultural difference, limited communication skills, and social isolation have caused disadvantaged and handicapped persons to have little contact with the world of work. Familiarity with the work setting in which a particular job takes place, relationships with other workers, business use of the telephone, relationship of one's job to other jobs in the same business are just a few examples of areas where special students may require special exposure by means of field trips, spending a day on the job, viewing films, or having additional training sessions.

Note: For those with physical impairments, field trips, on-site job observations, and work experience opportunities will be limited to "accessible" businesses in the community. Before deciding where to go, determine whether the facilities are accessible.

DEMONSTRATION AND TRYOUT. Demonstration by the teacher, experienced workers, and previously-trained students provide reliable role models for learners. Steps, procedures, precautions, physical manipulation, and techniques are imprinted visually in the order and at the time they should occur in task performance. Immediate tryout of the task following the demonstration or an immediate attempt of each step, technique, or procedure as it is demonstrated provides students direct involvement, permits correction and clarification, and promotes retention. Tryout also identifies areas in performance steps, techniques, tools, and work environment where handicapped students need to have modification in order to perform tasks and meet industry standards.

ELIMINATION OF STEREOTYPING. Disadvantaged and handicapped people face more than the sex role stereotyping myths in their quest for employment. The following are just a few examples: "Deaf people are dumb." "The best job for blind people is tuning pianos." "He'll never be able to do that; he's a cripple." "Mr. _____ was no good; neither is his son." "She can

never do that; her parents didn't go to college." In addition to overcoming the unfounded assumptions of others, disadvantaged and handicapped persons often have equal misconceptions about themselves thinking: "I can never do that." "_____, who is deaf, does assembly line work; that's what I'll do, too." "I'll never be anybody."

Overcoming stereotyping may begin with using sex fair instructional materials and media, exploring interests and abilities, exploring two or three nontraditional jobs, or complimenting accomplishments. It may include planning how to reach an educational goal, providing role models (a person with a like handicap or socioeconomic background who has succeeded), as well as observing persons in nontraditional work roles. It means doing whatever raises aspirations and increases self-worth. It means attempting to eliminate underemployment.

EMPLOYER INVOLVEMENT. Programs with employer input are more practical and in line with the current needs of the job market. Employers who make input feel a special kinship to the program and get a chance to see the students before meeting them in the job market.

For disadvantaged and handicapped students, employer involvement offers a very special opportunity to remove common misconceptions about their capabilities. It enables employers to help with any modification needed, see students performing tasks, and observe how the students relate to others. It gives students a chance to prove that they can do the work, that they will not endanger themselves or others, and that they will not increase expenses. These are major employer concerns. Both students and teachers should be prepared to provide reassuring answers and evidence to show there is no more risk than with the nonhandicapped.

Employers may be involved by giving class presentations; giving suggestions for program improvement and modifications; conducting mock interviews; and providing work experience, observations, worker interviews, job analysis, etc.

HANDS-ON EXPERIENCES, PROBLEM SOLVING, PERSONAL INVOLVEMENT (work samples, tryout exercises, games, role playing). Being involved in a sample of work through completing a product, performing related paper work, or role playing interpersonal relationships on the job keeps students interested, holds attention to the learning tasks, and injects the realities of working and job performance in the teaching/learning situation. It makes the student feel that the instruction is practical and valuable. Accomplishment means "qualified for work"--a great boost to self-esteem for those who doubt self-worth.

The instructor and other students should avoid taking over when handicapped students are awkward or slow in completing a task. The student cannot master the skill if someone else does it.

ILLUSTRATIONS (pictures, graphs, bulletin boards, transparencies, and other visuals). The disadvantaged, the mentally retarded, and the hearing impaired, particularly, are especially oriented to visual methods of learning. Other students, with the exception of the blind and some visually impaired, will appreciate visual presentation of information to

be learned. Student handouts, with the steps to a task illustrated and briefly and simply explained, are especially helpful. Captioning and brief explanations are important supplements. Many illustrations may be adapted for the visually impaired by making them tactile (so that they can be felt). Sometimes enlarged print and bold outlines help.

INTERACTION; INDEPENDENCE. Economic deprivation, geographic isolation, cultural isolation, and restrictions on mobility and social relationships imposed by physical impairments have limited the experiences of the disadvantaged and the handicapped in the community at large. Many have no previous work experience, little observation of the worker's daily routine, and limited social experiences. They have been sheltered at home, absent from the scene, and at best, onlookers.

So that they will not continue in this role after vocational training, experiences in the community and involvement with nonhandicapped people and other students are of utmost importance. These students, as well as their families and the working community, need proof that they can function independently and competently. They need to establish contacts who can serve as references to recommend them as competent workers who can relate to others.

Field trips, worker interviews, cooperative work experience, spending a day on the job, giving talks before civic groups are, therefore, important to the acclimation of disadvantaged and handicapped students to the world of work. Participating in team work projects with other students; pairing with a slower or faster learning peer; pairing with a nonhandicapped, a nondisadvantaged, or person from another race or culture will help achieve faster comprehension and understanding and promote learning communication skills. Teaching special units dealing with related communication and social skills will also be necessary; for example: office etiquette, relationships with employer and other employees, daily work expectations which are not direct task performance, telephone skills, appropriate dress and grooming habits, to name a few.

LISTENING (explaining, discussing, reacting orally). Learning by listening is an important tool to the disadvantaged, the visually impaired, the speech impaired, the learning disabled, and others who "prefer to be told" or "have to be told" rather than read about it.

The visually impaired require identification of familiar sounds in the work place to determine location of different work areas, equipment functions, and hazards. The hearing impaired require sight substitutions, such as indicator lights, for critical sounds they cannot hear. They may use lip reading, interpreting, and sound conduction or amplification devices. The retarded need to become accustomed to the sounds of the work place so that they can work without being distracted. The speech impaired need to be given the right to listen although they may have trouble participating, or may not be able to participate orally.

When information is presented for listening, instruction in how to listen (what to listen for) is important. An outline of the information presented, supplemented by visuals, tryout exercises, showing, completion

of a guidesheet questions to be answered, analysis of cases or problem situations, or other application activities will enhance use and retention of information heard.

Listening is a vocational skill as well as a learning skill. Workers must be able to receive information by listening as well as provide information for listening. Most on-the-job instruction is given orally. Explanation must be given to and received from customers, co-workers, and supervisors.

READING HELPS. Being fluent in the technical vocabulary or language of the job and able to read at the level required by the job is a part of occupational competency. On-the-job reading requirements may vary from the reading of signs to following instructions given in technical manuals. The instruction given in reading, then, for vocational purposes, will depend on the reading skills possessed by the student and the reading requirements of the job. Whether or not a supplemental class in remedial reading is offered, the vocational instructor will find that providing reading aids also helps provide job skill.

Braille materials, large print textbooks, magnifying devices, and recordings may be provided for the visually impaired. Materials may be simplified or outlined for the hearing impaired and others with limited language skills. The native language may be supplied above the English for critical information in textbooks used by the limited English-speaking. Familiarity with the setting in which the printed information is applied may be given via field trips, demonstrations, or films to make reading easier and more meaningful.

Students with exceptional reading problems may require the help of a special reading teacher or be enrolled in a remedial reading program. Some schools employ vocational reading teachers to assist vocational students with developing vocational reading skills and doing the reading required in their programs.

RECORDING AND RECORDINGS (tapes, records, radio programs). Information may be presented and gained by listening to recorded information rather than reading. This strategy will aid the nonreader, the poor reader, the visually impaired, the learning disabled, and others through use as a variation of teaching technique. Recording is also a useful tool for the deaf in notetaking; the recording script may be transcribed into print later by a hearing individual. It will also provide instruction for those who have missed initial classroom presentation of information or who need review. Recordings may be supplemented by slides and pictures.

RELATED MATH. Competency in math, like competency in reading, is more critical to some jobs than to others. Math is best taught in relation to the task of which it is a part. This instruction should incorporate basic math and remedial math instruction as needed. A cooperative or team teaching effort with the math teachers or related math instructors in the school will relieve the burden on the vocational instructor. Enough practice and application exercises should be provided to insure retention of the math operations involved. It is helpful to compile a list of the

math competencies needed to complete the training program, prepare an assessment test to determine student skills, and plan in the beginning a program which the student can follow to attain the basic math competencies prerequisite to the course. If the skills cannot be acquired simultaneously to the job skill training program, the student should postpone entry into the course until the prerequisite skills are attained. It may be necessary to prepare a special manual and modules to provide the related math instruction.

REMEDIAL AND RETENTION EXERCISES. Doing learning activities does not necessarily make students occupationally competent. Performance must be observed, misunderstandings clarified, procedures and techniques corrected, and repetition called for at a future time. Lesson planning should anticipate theory and tasks with which students are likely to have difficulty, include additional practice exercises, and provide alternate approaches to teaching. Repetition for retention should be provided, such as repetition of information in different media presentations or use of different types of application exercises. Review sessions, keeping notebooks, completing work samples, doing live work, and solving cases will also help.

SAFETY. The Occupational Health and Safety Act has increased employer concern for safety and underscored the importance of providing safety instruction along with task performance. It is especially important for the handicapped in two ways: (1) to overcome employer concern about the handicapped person's ability to take care of himself/herself and not endanger the lives of others; (2) to identify and deal with situations which are hazardous for persons because of particular handicaps.

To meet these needs for safety instruction, the handicapped student not only needs the basic or general safety instruction related to the occupation but safety instruction or special safety provisions needed for a person with his/her particular handicap. An example is the installation of a blinking light to tell a person who is deaf that the equipment is running.

Note: The Kentucky Department of Labor, Occupational Safety and Health Program, Division of Education and Training, Frankfort, Kentucky 40601, Phone: (502) 564-6895, offers training programs to help vocational instructors teach safety.

SUPPORT SERVICES. Some students will require emotional, social, and financial support in order to succeed in the instructional programs. Others will need career counseling and special assistance in becoming employed. Government agencies, special schools, special personnel, and organizations for disadvantaged and handicapped persons can provide this help. The following are examples and should not be considered an all-inclusive list: resource room teachers, rehabilitation counselors, guidance counselors, tutors, remedial teachers, instructors in special schools, occupational therapists, diagnostic specialists, media personnel, handicapped workers, workers who are members of a minority group, social workers, and others who can serve as role models. Survey the community to identify persons who serve the needs of disadvantaged and handicapped persons in your area and incorporate their assistance in related learning activities.

UNIQUE MODIFICATIONS (modified equipment, tools, learning aids, changes in work environment, adaptations in course or training program content). Some students require special help in meeting physical job requirements. When considering modification, it is important to concentrate on what the student can do. If at all possible, enable the student to function in the work environment as it is usually found. Employers look favorably on handicapped persons with this kind of preparation.

Rehabilitation centers; organizations and schools for the blind, deaf, dyslectic, disabled, and the mentally handicapped; and publishers and manufacturers of special instructional materials, aids, and equipment can offer aid in meeting unique needs. Consultation with special education personnel and rehabilitation counselors is a good starting point. The student should also be asked to make suggestions.

Care should be taken to insure occupational competency. Prospective employers should be shown how the modification operates in the work setting and how it increases efficiency.

The previously described list of strategies is not exhaustive. Others may be added. All will need to be directed toward the occupation for which training is being given, the students enrolled, the availability of instructional materials, and the community. It is also important to remember that what works well for one group of students or a particular student will not necessarily work well for another.

PRACTICAL ARTS
CONSTRUCTION EXPLORATION

Task Assignment Sheets PA-CO 1-14

Practical Arts

CONSTRUCTION EXPLORATION

TASK: USING FASTENING DEVICES

INTRODUCTION

Carpenters must be able to choose, position and install nails correctly in order to join various carpentry materials. In this task assignment sheet, you will learn how to use some fastening devices.

OBJECTIVE

GIVEN a claw hammer, two 2" X 4" X 2' boards, two 16d common nails, and a framing square,

NAIL THE BOARDS TOGETHER.

YOU SHOULD place the boards at right angles and square to each other. The nails should be driven their entire length into the wood without bending the nails, splitting the wood, or damaging the boards.

LEARNING ACTIVITIES

1. READ about various types of nails. Your teacher will provide a reference. DISCUSS the information.
2. EXAMINE a display of various types and sizes of nails. LISTEN as your teacher explains how each type is used.
3. WATCH your teacher demonstrate how to nail two 2" X 4" boards together with two 16d common nails. OBSERVE how to use a framing square.
4. PRACTICE driving and pulling common nails with a claw hammer. PRACTICE nailing two 2" X 4" boards until you can join them accurately and solidly.
5. ARRANGE with your teacher to complete this task by going through the CHECK-OUT ACTIVITY.

CHECK-OUT ACTIVITY

Your teacher will provide the necessary supplies. Nail two 2" X 4" X 2' boards together so that they are at right angles and square with each other.

VOCABULARY

Claw hammer - a hammer with one end of the head forked and curved like a claw, used for pulling nails.

Framing square - an instrument having two sides that can be used to test the squareness of anything.

INSTRUCTOR'S FINAL CHECKLIST**USING FASTENING DEVICES**

Performance Level: All items must receive a rating of ACCOMPLISHED. If any items are rated NOT ACCOMPLISHED, the student and the instructor will decide if any learning activities must be repeated.

Accomplished	Not Accomplished
--------------	------------------

In nailing two boards together, the student:

- | | | |
|---|-------|-------|
| 1. Placed them so that they are at right angles and square to each other..... | [] | [] |
| 2. Drove the nails their entire length into the wood... | [] | [] |
| 3. Did not bend the nails..... | [] | [] |
| 4. Did not split the wood..... | [] | [] |
| 5. Did not damage the boards..... | [] | [] |

Practical Arts

CONSTRUCTION EXPLORATION

TASK: USING CUTTING TOOLS

INTRODUCTION

In order to provide for sturdy construction and good craftsmanship, a carpenter must know how to mark and cut wooden members of a house accurately. In this task assignment sheet, you will learn how to use basic cutting tools.

OBJECTIVE

GIVEN a crosscut hand saw, rip hand saw, framing square, pencil, and a 2" X 4" X 2' pine board,

LAYOUT AND CUT THE BOARD.

YOU SHOULD select the proper cutting tools and cut the board squarely and to the desired length.

LEARNING ACTIVITIES

1. LOOK AT a display of cutting tools. Your teacher will show it to you.
2. READ about selecting and using the proper hand saws. Your teacher will give you a reference. DISCUSS the information.
3. WATCH your teacher demonstrate how to layout and cut a 2" X 4" board.
4. PRACTICE laying out and cutting a 2" X 4" pine board.
5. ARRANGE with your teacher to complete this task by going through the CHECK-OUT ACTIVITY.

CHECK-OUT ACTIVITY

You will be provided a 2" X 4" X 2' pine board and cutting tools. Select the proper tools, and layout and cut the board to the proper length. Your teacher will tell you the length to which it should be cut.

INSTRUCTOR'S FINAL CHECKLIST

USING CUTTING TOOLS

Performance Level: All items must receive a rating of **ACCOMPLISHED**. If any items are rated **NOT ACCOMPLISHED**, the student and the instructor will decide if any learning activities must be repeated.

Accomplished	Not Accomplished
--------------	------------------

In using cutting tools, the student:

- | | | |
|--|-------|-------|
| 1. Selected the proper tools..... | [] | [] |
| 2. Cut the board squarely..... | [] | [] |
| 3. Cut the board to the proper length..... | [] | [] |

Practical Arts

CONSTRUCTION EXPLORATION

TASK: ASSEMBLING AND ERECTING A WALL SECTION

INTRODUCTION

A carpenter must know how to assemble and erect a wall section in order to construct a house. In this task assignment sheet, you will learn how to assemble and erect a wall section.

OBJECTIVE

GIVEN pieces of lumber of 2" X 4" dimension, ruler, square, claw hammer, nails (16d), and hand saw,

CUT AND ASSEMBLE THE PIECES AND ERECT A MODEL WALL SECTION.

YOUR WORK will be rated in accordance with the Instructor's Final Checklist.

LEARNING ACTIVITIES

1. READ about basic house construction. Your teacher will provide a reference. DISCUSS the information.
2. LISTEN and OBSERVE as your teacher shows you the parts of a wall section and explains their functions.
3. VISIT a construction site and OBSERVE the assembling and erection of a wall section.
4. APPANGE with your teacher to complete this task by going through the CHECK-OUT ACTIVITY.

CHECK-OUT ACTIVITY

You will be provided the necessary tools and materials. Assemble and erect a model wall section.

VOCABULARY

Assemble - to put together.

Cap Plate - the uppermost plate in a frame wall that has two plates at the top; may also be called a "Doubler" or "Rafter Plate."

Erect - to build.

Jolst - a horizontal structural member that, together with other similar members, supports a floor or ceiling, system.

Sole plate - (bottom plate) the lowest plate in a wall in a platform framing system, resting on the sub floor.

Top Plate - the framing member nailed across the upper ends of studs and beneath any cap plate.

Sub floor - the rough floor laid across floor joists and under finish flooring.

INSTRUCTOR'S FINAL CHECKLIST

ASSEMBLING AND ERECTING A WALL SECTION

Performance Level: All items must receive a rating of ACCOMPLISHED. If any items are rated NOT ACCOMPLISHED, the student and the instructor will decide if any learning activities must be repeated.

Accomplished	Not Accomplished
--------------	------------------

In assembling and erecting a model wall, the student:

- | | | | |
|---|-----|-----|-----|
| 1. Measured and cut each piece of the wall section accurately: | | | |
| a. Sole plate | [] | [] | [] |
| b. Top plate | [] | [] | [] |
| c. Cap plate | [] | [] | [] |
| d. Studs | [] | [] | [] |
| 2. Nailed the pieces together securely | [] | [] | [] |
| 3. Observed 16" O.C. for studs | [] | [] | [] |
| 4. Erected and fastened the wall squarely and securely to the floor | [] | [] | [] |

Practical Arts

CONSTRUCTION EXPLORATION

TASK: LAYING OUT AND CUTTING A COMMON RAFTER

INTRODUCTION

The roof of a building provides a watertight covering. Carpenters must know how to layout and cut common rafters in order to construct a roof with the proper pitch. The pitch must provide for adequate drainage of snow and rain. In this task assignment sheet, you will learn how to layout and cut a common rafter.

OBJECTIVE

GIVEN a 2" X 4" board, a framing square, a hand saw, and the necessary information,

LAYOUT AND CUT A COMMON RAFTER.

YOUR RAFTER should fit the template supplied by your teacher.

LEARNING ACTIVITIES

1. READ about roof construction. Your teacher will provide a reference. DISCUSS the information.
2. OBSERVE and LISTEN as your teacher demonstrates how to layout and cut a common rafter.
3. PRACTICE using a framing square to layout different pitched roofs with various spans. PRACTICE cutting a rafter.
4. ARRANGE with your teacher to complete this task by going through the CHECK-OUT ACTIVITY.

CHECK-OUT ACTIVITY

Your teacher will provide the necessary supplies and information. Layout and cut a common rafter to fit the template supplied by your teacher.

VOCABULARY

1. Bird's mouth - the notch in the rafter that fits the top plates of the wall studs.
2. Common rafter - one of several identical roof structural members that runs at a right angle to the wall and ends at a right angle to the ridgeboard.
3. Pitch - the slope of a roof.
4. Ridgeboard - the horizontal board where the rafters meet at the very top of the roof; it runs the length of the roof.
5. Template - a full size pattern.

INSTRUCTOR'S FINAL CHECKLIST

LAYING OUT AND CUTTING A COMMON RAFTER

Performance Level: All items must receive a rating of **ACCOMPLISHED**. If any items are rated **NOT ACCOMPLISHED**, the student and the instructor will decide if any learning activities must be repeated.

Accomplished	Not Accomplished
--------------	------------------

The student's rafter fit the template.....

[	]	[	]
---	---	---	---

Practical Arts

CONSTRUCTION EXPLORATION

TASK: INSTALLING ASPHALT SHINGLES

INTRODUCTION

Buildings must have a protective, water-resistant covering. Therefore, roofers must know how to install a roof properly. In this task assignment sheet, you will learn how to install asphalt shingles.

OBJECTIVE

GIVEN a bundle of asphalt shingles, felt paper roofing, hammer, roofing nails, roofer's knife, straightedge, and chalkline,

INSTALL THE SHINGLES ON A ROOF MODEL.

THE ROOFING PAPER should be applied properly. THE SHINGLES should be cut accurately and evenly, aligned properly, fastened securely, and the ends trimmed neatly.

LEARNING ACTIVITIES

1. READ and DISCUSS Instruction Sheet 1, HOW TO INSTALL ASPHALT SHINGLES.
2. WATCH your teacher demonstrate how to apply roofing paper. PRACTICE applying roofing paper on a roof model.
3. WATCH your teacher demonstrate how to cut asphalt shingles. PRACTICE cutting a shingle.
4. WATCH your teacher demonstrate how to install asphalt shingles. PRACTICE installing several shingles on the roof model.
5. ARRANGE with your teacher to complete this task by going through the CHECK-OUT ACTIVITY.

CHECK-OUT ACTIVITY

You will be provided the necessary tools and supplies. Install asphalt shingles on the roof model provided by your teacher.

VOCABULARY

Course - the exposed row or layer of an exterior finishing material such as shingles, bricks, or siding.

Eaves - the part of the roof that extends beyond its supporting walls.

Flush - at the same level or in the same plane.

Ridge - the uppermost line of a roof where two opposite slopes meet.

Roof sheathing - the material, usually in sheet form, applied across the exterior studs and rafters for strength and protection.

Shingles - thin pieces of material applied in overlapping courses as a weatherproof covering on walls and roofs.

INSTRUCTION SHEET 1

HOW TO INSTALL ASPHALT SHINGLES

Follow this procedure when installing asphalt shingles.

Apply roofing paper.

Apply a layer of 15 lb. asphalt saturated felt roofing paper to the roof sheathing. Overlap the felt 4" at all end joints. Start the second and all remaining courses with a 17" exposure, so that all areas of the roof are covered with at least two thicknesses of felt. Fasten down the paper with roofing nails.

Install the asphalt shingles.

1. Apply a starter strip of shingles along the bottom edge of the roof along the eaves. Turn the tabs toward the roof ridge. Secure the shingles with roofing nails spaced so that the nailheads will not be exposed when the next course is applied.
2. Draw a straight chalk line horizontally across the roof sheathing to mark the location for each course of shingles.
3. Start the first course of shingles with a full shingle. Place the shingles over the starter strip. To prevent buckling, start the nailing at the end nearest the last shingle applied. Drive the nails straight to avoid cutting the shingle. Do not drive the nailhead below the surface, but keep it flush with the shingle.

Use four nails for each three-tab, square-butt shingle. Place the nails across the shingle 5/8" above the cutouts. Hammer a nail 1" from each end of the shingle and a nail over the center line of each cutout.

4. Start the second course with a full shingle cut 6" short (or $\frac{1}{2}$ a tab). Lay the shingles so that the cutouts between the tabs fall over the center of the tabs in the course below.
5. Start the third course with a full shingle, the fourth course with a $\frac{1}{2}$ tab, and so on, until the shingles reach the ridge of the roof.
6. Trim the ends of the shingles evenly with a roofer's knife.
7. Cut some shingles into three tabs. Trim the sides of each tab so the covered portion will be 1" narrower than the exposed portion.
8. Apply tabs across the ridge. Bend the tabs lengthwise down the center. Nail them down, beginning at one end of the ridge with a 5" exposure. Nail each piece on each side 5 $\frac{1}{2}$ " back from the exposed end and 1" up from the edge.

INSTRUCTOR'S FINAL CHECKLIST**INSTALLING ASPHALT SHINGLES**

Performance Level: All items must receive a rating of ACCOMPLISHED. If any items are rated NOT ACCOMPLISHED, the student and the instructor will decide if any learning activities must be repeated.

Accomplished	Not Accomplished
--------------	------------------

In installing asphalt shingles, the student:

- | | |
|---|---------|
| 1. Applied the roofing paper properly..... | [] [] |
| 2. Cut the shingles accurately and evenly..... | [] [] |
| 3. Aligned the shingles properly..... | [] [] |
| 4. Fastened the shingles securely..... | [] [] |
| 5. Trimmed the ends of the shingles neatly..... | [] [] |

Practical Arts

CONSTRUCTION EXPLORATION

TASK: POUR A CONCRETE STEPPING STONE

INTRODUCTION

A well constructed building has a level, strong, solid foundation. For this reason, a masonry worker must be able to mix concrete and pour it into a form. In this task assignment sheet, you will learn how to mix concrete and pour a concrete stepping stone.

OBJECTIVE

GIVEN a wheelbarrow, mixing hoe, bag of concrete mix, water, and a form,
POUR A CONCRETE STEPPING STONE.

YOUR STEPPING STONE should be set and dry within the proper length of time, release from the form intact with no honeycomb appearance.

LEARNING ACTIVITIES

1. READ about mixing concrete. Your teacher will provide the reference.
DISCUSS the information.

2. VISIT a construction site and OBSERVE concrete being mixed and poured,

OR

INTERVIEW a construction worker about his/her job.

3. WATCH your teacher demonstrate how to mix concrete and pour it into a form.
4. PRACTICE mixing a small batch of concrete with a group of classmates.
5. ARRANGE with your teacher to complete this task by going through the CHECK-OUT ACTIVITY.

CHECK-OUT ACTIVITY

Your teacher will provide the necessary materials. Mix a batch of concrete and pour a concrete stepping stone.

INSTRUCTOR'S FINAL CHECKLIST**POUR A CONCRETE STEPPING STONE**

Performance Level: All items must receive a rating of **ACCOMPLISHED**. If any items are rated **NOT ACCOMPLISHED**, the student and the instructor will decide if any learning activities must be repeated.

Accomplished	Not Accomplished
--------------	------------------

The student's stepping stone:

- | | | |
|--|-------|-------|
| 1. Set and dried within the proper length of time..... | [] | [] |
| 2. Released from the form intact..... | [] | [] |
| 3. Had no honeycomb appearance..... | [] | [] |

Practical Arts

CONSTRUCTION EXPLORATION

TASK: MIXING MORTAR

INTRODUCTION

Mortar is used to securely bond masonry materials to form a wall. The hod carrier must be able to mix a batch of mortar with the correct consistency. In this task assignment sheet, you will learn how to mix mortar.

OBJECTIVE

GIVEN masonry cement, sand, water, shovel, wheelbarrow or mortar box, and mortar hoe,

MIX A BATCH OF MORTAR.

THE MORTAR should contain the proper proportions of materials and be of the proper consistency.

LEARNING ACTIVITIES

1. EXAMINE the proportions of masonry cement, sand, and water used to mix mortar.
2. WATCH your instructor mix a batch of mortar.
3. PRACTICE mixing a small batch of mortar. Work with a classmate. Your teacher will check the consistency of your mortar.
4. APRANGE with your teacher to complete this task by going through the CHECK-OUT ACTIVITY.

CHECK-OUT ACTIVITY

You will be provided the necessary tools and materials. Mix a batch of mortar.

INSTRUCTOR'S FINAL CHECKLIST

MIXING MORTAR

Performance Level: All items must receive a rating of **ACCOMPLISHED**. If any items are rated **NOT ACCOMPLISHED**, the student and the instructor will decide if any learning activities must be repeated.

Accomplished	Not Accomplished
--------------	------------------

The students' mortar:

- | | |
|---|-------------|
| 1. Contained the proper proportions of water, sand, and cement..... | [] [] [] |
| 2. Was of the proper consistency..... | [] [] [] |

Practical Arts

CONSTRUCTION EXPLORATION

TASK: LAYING A MULTI-COURSE WALL

INTRODUCTION

Many buildings or parts of buildings are constructed with concrete block. Perhaps the basement of your house is concrete block. A mason must know how to lay the blocks to build these multi-course walls (walls of several rows of block). In this task assignment sheet, you will learn how to lay a multi-course wall.

OBJECTIVE

GIVEN mortar, 8" concrete blocks, mason's trowel, mason's hammer, level, jointing or rodding tool, and a string line,

LAY A MULTI-COURSE WALL.

YOU will be rated in accordance with the Instructor's Final Checklist.

LEARNING ACTIVITIES

1. READ and DISCUSS Instruction Sheet I, HOW TO LAY A MULTI-COURSE WALL,
or
READ and LOOK AT pictures illustrating basic blocklaying in a reference provided by your teacher.
 2. EXAMINE the tools used in laying blocks. WATCH your teacher demonstrate how to use each one. PRACTICE reading a level.
 3. PRACTICE SPREADING MORTAR.
 4. WATCH your teacher do a dry layout on the footing. PRACTICE laying out blocks.
 5. WATCH your teacher lay the corner block. PRACTICE laying a corner block.
 6. WATCH your teacher lay the intermediate blocks. PRACTICE laying intermediate blocks.
 7. ARRANGE with your teacher to complete this task by going through the CHECK-OUT ACTIVITY.
-

CHECK-OUT ACTIVITY

You will be provided the necessary tools and supplies. Lay two courses of concrete block.

INSTRUCTION SHEET I

HOW TO LAY A MULTI-COURSE WALL

To build a wall of concrete blocks, you must have a sturdy, level, and correct size footing to support the blocks.

Follow these steps in laying a multi-course wall:

1. Make a dry layout of the blocks without mortar. Lay each block in the center of the footing, leaving 4" of the footing on both sides of the block.

Most blocks are designed to use a 3/8" mortar joint. Make small adjustments to allow for equal mortar joints without cutting any blocks.

When the blocks are properly positioned, mark a chalk line around them on the footing. Remove the blocks.

2. Apply mortar to the full wall thickness on the footing. Lay the first corner block in the correct position. Lightly tap the block with the handle of the trowel or block hammer to bring it down to the correct height and level. Check the block with a level, first lengthwise and then crosswise. Work the block down by tapping until a 3/8" mortar joint is reached.
3. Lay another corner block in the other corner, following the same procedure as for the first one.
4. Lay each corner two courses high before laying the intermediate blocks.
5. Stretch a string line between the corner blocks to help control the height of the intermediate blocks.
6. Lay the intermediate blocks. Be sure to check each block with a level, first lengthwise and then crosswise. Also check the position of the blocks in relation to the other blocks in the course.
7. When laying the last block in a course (against the corner block), "butter" all end joints with mortar. Spread mortar on both ends of the block to be laid and adjoining blocks already laid in the course.
8. When the blocks have been laid, allow time for the mortar joints to become stiff, but not completely dry. Use a jointing tool to smooth all joints. Do the vertical joints first, then the horizontal.
9. Clean all tools with water immediately. (A water hose is best so that all concrete can be removed before drying completely.) Coat all metal tools with a light coat of oil after drying to prevent rusting.

INSTRUCTOR'S FINAL CHECKLIST

LAYING A MULTI-COURSE WALL

Performance Level: All items must receive a rating of ACCOMPLISHED. If any items are rated NOT ACCOMPLISHED, the student and the instructor will decide if any learning activities must be repeated.

Accomplished	Not Accomplished
--------------	------------------

In laying a multi-course wall, the student:

- | | |
|--|---------|
| 1. Did a dry lay-out of the blocks on the footing | [] [] |
| 2. Marked along the blocks with a chalkline | [] [] |
| 3. Laid the corner blocks first | [] [] |
| 4. Stretched a string line from corner to corner | [] [] |
| 5. Laid the intermediate blocks | [] [] |
| 6. Checked each block lengthwise and then crosswise with a level | [] [] |
| 7. Laid two courses | [] [] |
| 8. Smoothed the joints | [] [] |
| 9. Washed all tools thoroughly | [] [] |
| 10. Coated the metal tools with a light coat of oil..... | [] [] |

Practical Arts

CONSTRUCTION EXPLORATION

TASK: JOINING PLASTIC FITTINGS

INTRODUCTION

Plastic pipe is commonly used in water transmission, drainage, and sprinkler systems. People who work in plumbing must be able to join the pieces together in order to complete a water system. In this task assignment sheet, you will learn how to join plastic pipe and fittings.

OBJECTIVE

GIVEN 1/2" ABS black plastic pipe, plastic pipe cement, coupling or T-joint, and fine sandpaper,

JOIN THE PIPE AND FITTING.

THE PIPE should fit straight into the fitting and should not come out of the fitting when pulled.

LEARNING ACTIVITIES

1. READ and DISCUSS Instruction Sheet 1, HOW TO JOIN PLASTIC FITTINGS.
2. WATCH your teacher demonstrate how to join plastic pipe to a fitting.
3. PRACTICE joining plastic pipe to a fitting.
4. ARRANGE with your teacher to complete this task by going through the CHECK-OUT ACTIVITY.

CHECK-OUT ACTIVITY

You will be provided the necessary supplies. Join plastic pipe to a fitting.

VOCABULARY

Coupling - a device or part for joining two pipes together.

T-joint - pipe fitting similar to the letter "T", used to join three pipes.

INSTRUCTION SHEET I

HOW TO JOIN PLASTIC FITTINGS

Follow these steps when joining plastic pipe to a fitting:

1. Use a piece of fine sandpaper to sand the end of the pipe on the outside and the end of the joint on the inside. This cleans the pipe and helps make a much stronger bond.
2. Carefully apply the solvent (cement) to the sanded surfaces of both pieces: outside of the pipe and inside of the joint. (The solvent softens the surface of the parts and melts the parts together. A water-tight joint is formed.)
3. Press the pieces together quickly and firmly.
4. Let the solvent dry.

INSTRUCTOR'S FINAL CHECKLIST

JOINING PLASTIC FITTINGS

Performance Level: All items must receive a rating of **ACCOMPLISHED**. If any items are rated **NOT ACCOMPLISHED**, the student and the instructor will decide if any learning activities must be repeated.

Accomplished	Not Accomplished
--------------	---------------------

The pipe:

- | | | |
|--|-----|-----|
| 1. Fit straight into the fitting | [] | [] |
| 2. Did not come out of the fitting when pulled | [] | [] |

Practical Arts

CONSTRUCTION EXPLORATION

TASK: WIRING A SWITCHED LIGHT CIRCUIT

INTRODUCTION

The electrician must be able to wire lights and switches that are installed in homes. In this task assignment sheet, you will learn how to wire a switched light circuit.

OBJECTIVE

GIVEN a size D flashlight battery, flashlight bulb, switch, 2-foot lamp cord, and electrical tape,

WIRE THE SWITCHED LIGHT CIRCUIT.

THE LIGHT should burn when the switch is closed and go out when the switch is opened.

LEARNING ACTIVITIES

1. READ and DISCUSS Instruction Sheet I, HOW TO WIRE A SWITCHED LIGHT CIRCUIT.
2. READ about wiring switched light circuits. Also READ about safety rules to be observed when working with electricity. Your teacher will provide a reference. DISCUSS the information.
3. LOOK AT the supplies used to wire a switched light circuit. IDENTIFY the + pole and the - pole of the battery.
4. WATCH your teacher demonstrate how to wire a switched circuit.
5. PRACTICE wiring a switched light circuit.
6. ARRANGE with your teacher to complete this task by going through the CHECK-OUT ACTIVITY.

CHECK-OUT ACTIVITY

You will be provided the necessary supplies. Wire a switched light circuit.

VOCABULARY

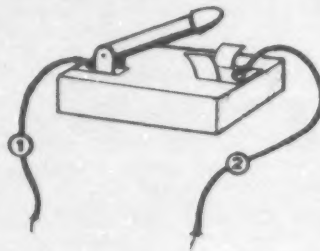
- pole - the flat end of the battery.
- + pole - the end of the battery with the center contact.

INSTRUCTION SHEET I

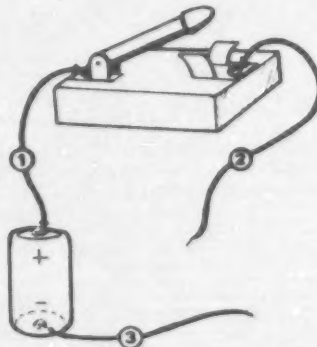
HOW TO WIRE A SWITCHED LIGHT CIRCUIT

Follow this procedure to wire a switched light circuit.

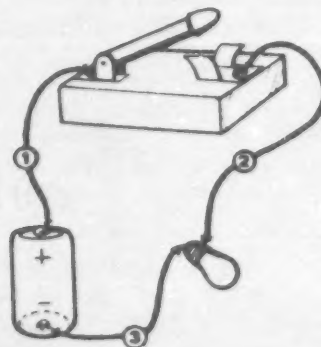
1. Connect two wires to the switch.



2. Tape wire "1" from the switch to the + pole of the flashlight battery. Tape another wire, "3," to the - pole of the battery.



3. Tape wire "3" from the - pole of the battery to the base of the flashlight bulb. Tape wire "2" from the switch to the side of the bulb.



INSTRUCTION SHEET 1, (page 2)

4. Close the switch. The light should burn. If it doesn't, recheck the wire, bulb, and battery. They must be in good condition and the connections must be tight and make good contact.

INSTRUCTOR'S FINAL CHECKLIST

WIRING A SWITCHED LIGHT CIRCUIT

Performance Level: All items must receive a rating of ACCOMPLISHED. If any items are rated NOT ACCOMPLISHED, the student and the instructor will decide if any learning activities must be repeated.

Accomplished	Not Accomplished
--------------	------------------

The light:

- | | | |
|---|-------|-------|
| 1. Burned when the switch was closed..... | [] | [] |
| 2. Went out when the switch was opened..... | [] | [] |

Practical Arts

CONSTRUCTION EXPLORATION

TASK: IDENTIFYING DEFECTIVE FUSES

INTRODUCTION

When buildings are wired for electricity, the wiring system provides protection from overloads of electricity and short circuits. This protection is provided through the use of fuses or circuit breakers. When fuses are used, they sometimes become defective or "blow." In this task assignment sheet, you will learn how to identify a defective fuse.

OBJECTIVE

GIVEN a fuse panel with one or more blown fuses,

IDENTIFY THE BLOWN FUSE OR FUSES.

YOU SHOULD identify each blown fuse.

LEARNING ACTIVITIES

1. READ about fuses. Your teacher will provide a reference. DISCUSS the information.
2. EXAMINE a display of different types of fuses. Your teacher will show them to you.
3. DETERMINE whether your home wiring system is protected by a circuit breaker or fuses. REPORT to the class.
4. PRACTICE locating blown fuses.
5. ARRANGE with your teacher to complete this task by going through the CHECK-OUT ACTIVITY.

CHECK-OUT ACTIVITY

Go to the fuse panel. Make a rough sketch of the panel. Mark an "X" across the blown fuse or fuses.

VOCABULARY

Circuit breaker - A protective device for an electrical wiring system; it heats when the electrical load gets too heavy, which releases a switch to cut off the current.

Fuse - A protective device for an electrical wiring system; a metal strip or link melts in two when the electrical load gets too heavy, and no further electrical current can flow through.

INSTRUCTOR'S FINAL CHECKLIST

IDENTIFYING DEFECTIVE FUSES

Performance Level: All items must receive a rating of **ACCOMPLISHED**. If any items are rated **NOT ACCOMPLISHED**, the student and the instructor will decide if any learning activities must be repeated.

Accomplished	Not Accomplished
--------------	------------------

The student identified each blown fuse on the fuse panel [] []

Practical Arts

CONSTRUCTION EXPLORATION

TASK: REPLACING A FUSE

INTRODUCTION

Electricity will not flow through a blown fuse. Therefore, the fuse must be replaced with a new one. In this task assignment sheet, you will learn how to replace a fuse.

OBJECTIVE

GIVEN a fuse panel with a blown fuse and a supply of fuses,

REPLACE THE BLOWN FUSE.

YOU WILL be rated in accordance with the Instructor's Final Checklist.

LEARNING ACTIVITIES

1. READ about replacing a fuse. Your teacher will provide a reference.
DISCUSS the information.
2. WRITE a brief report on "Using Safety Precautions When Replacing Fuses."
3. WATCH your teacher demonstrate how to replace a fuse.
4. PRACTICE replacing a fuse.
5. ARRANGE with your teacher to complete this task by going through the CHECK-OUT ACTIVITY.

CHECK-OUT ACTIVITY

Go to the fuse panel and replace the blown fuse with a new one. Your teacher will watch as you work.

INSTRUCTOR'S FINAL CHECKLIST

REPLACING A FUSE

Performance Level: All items must receive a rating of ACCOMPLISHED. If any items are rated NOT ACCOMPLISHED, the student and the instructor will decide if any learning activities must be repeated.

Accomplished	Not Accomplished
--------------	------------------

- | | | |
|--|-----|-----|
| 1. Turned off the current | [] | [] |
| 2. Located the "blown" fuse | [] | [] |
| 3. Removed the blown fuse | [] | [] |
| 4. Determined the correct size and type of fuse to be replaced | [] | [] |
| 5. Replaced the blown fuse with a new one | [] | [] |
| 6. Turned on the current | [] | [] |
| 7. Observed <u>all</u> safety precautions | [] | [] |

Practical Arts

CONSTRUCTION EXPLORATION

TASK: REPLACING A LIGHT SWITCH

INTRODUCTION

Light switches control the light source within a home or other structures. For this reason, an electrician must know how to install and replace light switches. In this task assignment sheet, you will learn how to replace a light switch.

OBJECTIVE

GIVEN a single-pole light switch, a screwdriver, and a pre-wired circuit with a defective light switch,

REPLACE THE LIGHT SWITCH.

YOU WILL BE RATED in accordance with the Instructor's Final Checklist.

LEARNING ACTIVITIES

1. LISTEN to your teacher explain the safety rules that must be followed when working with electricity.
2. READ about the basic principles of electricity. Your teacher will provide a reference. DISCUSS the information.
3. LISTEN and OBSERVE as your teacher demonstrates how to disconnect the electricity to the circuit, remove the defective switch, and install a new switch.
4. PRACTICE disconnecting the electricity to the circuit and removing a defective switch.
5. PRACTICE using a screwdriver to fasten wires safely and securely to the switch.
6. APPRANGE with your teacher to complete this task by going through the CHECK-OUT ACTIVITY.

CHECK-OUT ACTIVITY

Your teacher will provide the necessary materials. Replace a light switch in a pre-wired circuit.

INSTRUCTOR'S FINAL CHECKLIST**REPLACING A LIGHT SWITCH**

Performance Level: All items must receive a rating of ACCOMPLISHED. If any items are rated NOT ACCOMPLISHED, the student and the instructor will decide if any learning activities must be repeated.

Accomplished	Not Accomplished
--------------	------------------

In replacing a light switch, the student:

- | | |
|--|-------------|
| 1. Observed all safety rules..... | [] [] |
| 2. Disconnected the electricity to the circuit prior to beginning..... | [] [] |
| 3. Removed the defective switch properly..... | [] [] |
| 4. Installed the new switch so that it operated properly in the pre-wired circuit..... | [] [] |

Practical Arts

CONSTRUCTION EXPLORATION

TASK: REPLACING A RECEPTACLE

INTRODUCTION

A receptacle is an outlet into which a light plug is inserted. When electrical systems are installed, the electrician installs the receptacles. In this task assignment sheet, you will learn how to replace a receptacle.

OBJECTIVE

GIVEN an installed convenience-outlet receptacle, a new convenience-outlet receptacle, a screwdriver with a long blade and insulated handle, pocket knife, and thin-nose pliers,

REPLACE THE RECEPTACLE.

YOUR PERFORMANCE will be rated in accordance with the Instructor's Final Checklist.

LEARNING ACTIVITIES

1. READ about receptacles. Your teacher will provide a reference. DISCUSS the material.
2. LIST the kinds of receptacles in your home: convenience-outlet receptacles (duplex, triplex, single), dryer receptacle, range receptacle. REPORT to the class.
3. WATCH your teacher turn off the power to the circuit, remove a convenience-outlet receptacle and install a new convenience-outlet receptacle.
4. PRACTICE using a screwdriver to disconnect and fasten wires to the receptacle.
5. ARRANGE with your instructor to complete this task by going through the CHECK-OUT ACTIVITY.

CHECK-OUT ACTIVITY

Go to the receptacle. Turn off the power to the circuit, remove the old receptacle, and install a new receptacle. Your teacher will watch you as you work.

VOCABULARY

Ampere - A unit for measuring the strength of an electric current.

Convenience-outlet receptacle - The common type of electric wall outlet. There are three kinds: "single" which will take only one plug at a time; "duplex" which will take two plugs at a time; and "triplex" which will take three plugs at a time.

Dryer or range receptacles - An outlet that is shaped so that it will take the plug on a dryer or a range. Electric dryers use a 30 ampere receptacle. Electric ranges use a 50 ampere receptacle.

INSTRUCTOR'S FINAL CHECKLIST**REPLACING A RECEPTACLE**

Performance Level: All items must receive a rating of ACCOMPLISHED. If any items are rated NOT ACCOMPLISHED, the student and the instructor will decide if any learning activities must be repeated.

Accomplished	Not Accomplished
--------------	------------------

In replacing a convenience-outlet receptacle, the student:

1. Removed the old receptacle properly:

- | | | |
|---|-----|-----|
| a. Turned off the power to the circuit | [] | [] |
| b. Removed the receptacle plate | [] | [] |
| c. Removed the receptacle from the box | [] | [] |
| d. Unhooked the wires from the receptacle | [] | [] |

2. Installed a new receptacle properly:

- | | | |
|--|-----|-----|
| a. Attached the white wire(s) to the proper screw terminal(s) or push-in connection(s) | [] | [] |
| b. Attached the black wire(s) to the proper screw terminal(s) or push-in connection(s) | [] | [] |
| c. Connected the ground wire (if used) to the proper terminal post | [] | [] |
| d. Set receptacle into place | [] | [] |
| e. Replaced the receptacle plate | [] | [] |
| f. Turned on the power | [] | [] |